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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,100	10/02/2001	Vishnu K. Agarwal	500453.04	2699

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EXAMINER

FLETCHER III, WILLIAM P

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/970,100

Applicant(s)

AGARWAL ET AL.

Examiner

William P. Fletcher III

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 55,57,59,69,70,72 and 80-121 is/are pending in the application.
- 4a) Of the above claim(s) 80-83 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 55,57,59,69,70,72 and 84-110 is/are rejected.
- 7) ☒ Claim(s) 111-121 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/24/2004 has been entered.

Response to Arguments

2. Applicant's arguments, see the amendment and response filed 6/24/2004, with respect to the rejections under 35 U.S.C. § 112, 1st & 2nd Paragraphs, set-forth in the Office action mailed 4/19/2004, have been fully considered and are persuasive. Applicant's amendment has deleted those limitations both lacking written description and definiteness. Accordingly, these rejections have been withdrawn.

3. Applicant's arguments with respect to the rejections of the claims over prior art, set-forth in the above-mentioned Office action, have been fully considered and are persuasive. By amending the independent claims to recite specific cover layer materials excluding the DLC taught by Martin, the rejections have been overcome. Accordingly, these rejections have been withdrawn.

4. Applicant's arguments with respect to the rejections of the claims over prior art, set-forth in the above-mentioned Office action, have been fully considered and are persuasive. By amending the independent claims to recite specific cover layer materials excluding the DLC taught by Martin, the rejections have been overcome. Therefore, these rejections have been

withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US 3,508,890 A (see below).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 55, 69, 93, 103, 110, and 115 are rejected under 35 U.S.C. 102(b) as being anticipated by Fontanella (US 3,508,890 A).**

This reference teaches a method of manufacturing a coated abrasive article in which a backing member is coated first with an abrasive material and then over-coated with a hard oxide coating layer, of which alumina is an explicitly recited embodiment (1:10-2:6; 2:30-3:23).

It is the examiner's position that the embodiment illustrated in Fig. 2 anticipates the claims. A plurality of abrasive particles 11, which read on applicant's claimed "plurality of pattern elements," are deposited atop a surface of a resin-coated support 12-13, to form a plurality of contour surfaces thereon, projecting away from the surface. It is the examiner's position that the Fontanella's resin-coated support 12-13 reads on applicant's claimed "polymeric backing member." The definition of the term "resin" is inclusive of polymeric materials (see attached definition from *Merriam-Webster's Collegiate Dictionary*, p. 996). Cover layer 14 is deposited to cover the contour surfaces, directly contacting the backing member in the areas between the abrasive particles.

With particular regard to new claim 110, Fontanella teaches that the support 13 may be a cellulose-based material (2:30-39). Because cellulose is a polymer, it is the examiner's position that cellulosic support 13 reads on applicant's claimed "first layer of polymeric material."

Fontanella does not explicitly teach that the abrasive article is a polishing pad for planarization of a microelectronic-device substrate assembly. This is, however, merely a statement of intended use. Since Martin anticipates all of applicant's claimed method steps, and unless some critical method step has not been recited in the claims, it is the examiner's position that the abrasive article manufactured according to the method of Fontanella is inherently capable of planarizing a microelectronic-device substrate assembly.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. **Claims 57, 59, 70, and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A), as applied to claims 55 and 69, respectively, above, in further view of Martin et al. (US 5,551,959 A) and James et al. (US 6,069,080 A).**

The teaching of Fontanella is detailed above. This reference does not explicitly teach the deposition of the pattern elements in the fashion recited in these claims.

Martin teaches that abrasive particles may be applied to a backing either by adhering, like Fontanella, the particles to the make coat (6:1-7:67) or applying the abrasive and make coat material together as a slurry (5:11-36; 7:42-46; and 10:59-60).

James teaches a method of manufacturing a fixed-abrasive polishing pad in which solid abrasive particles are dispersed in an aqueous solution of a resin binder and sprayed onto the substrate. "Each layer is dried...before application of subsequent layers" (i.e., spray coating with subsequent evaporation) (11:40-63).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit the pattern elements by spray-coating with a liquid containing the pattern elements and evaporating the liquid to leave the pattern elements behind. One of ordinary skill in the art would have been motivated by the desire and expectation of successfully applying the particles to the backing member.

10. **Claims 84-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A), as applied to claims 55 and 69, respectively, above, in further view of Martin et al. (US 5,551,959 A).**

The teaching of Fontanella is detailed above. While this reference suggests backing materials (i.e., cellulose + resin), it is not limited thereto.

Martin teaches a method of manufacturing an abrasive article in which the preferred substrate is a polymeric film, such as polyester terephthalate film (10:60-61). Applicant discloses, at page 10 of the specification, the specific example of MYLAR, which is a polyester terephthalate film. Further, Martin teaches that the substrate can be a *flexible* material such as a polymeric film, primed polymeric film, cloth (including greige cloth), paper, vulcanized fiber, thermoplastics, non-wovens, metal (including metal substrates, metal foils, and the like) treated versions thereof, and combinations thereof (12:49-60). Thicker *rigid* polymeric composites or metal backing may also be used as the substrate. Absent evidence to the contrary, it is the examiner's position that this disclosure of a wide variety of substrates including sheets and sheet-like films of flexible or rigid polymers read on the compressible, incompressible, and cured resin substrates claimed.

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to utilize, as the backing member, any one of the materials taught by Martin. One of ordinary skill in the art would have been motivated to do so by the desire and expectation of successfully providing a backing member for the abrasive article, based on Martin's teaching that these are suitable materials for such a purpose.

11. Claims 55, 69, 90, 98, 100, 108, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Hirai et al. (US 4,312,921 A).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach silicon nitride as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing

(1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Hirai teaches that silicon nitride is a hard, abrasive material that may be vapor deposited onto the surface of a substrate (1:1-40).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, silicon nitride. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to adhere the abrasive particles to the backing. Further, because Hirai teaches that silicon nitride may be deposited by vapor deposition, as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

12. Claims 55, 69, 91, 101, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Adams et al. (US 5,664,990 A) and Watanabe et al. (US 4,242,373 A).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach ceria as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing (1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of

ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Adams teaches that ceria is a hard, abrasive material, used in abrading processes (1:49-57).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, ceria. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to adhere the abrasive particles to the backing.

Further, because Watanabe teaches that ceria may be deposited by vapor deposition (2:19-55), as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

13. Claims 55, 69, 92, 99, 102, 109, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Adams et al. (US 5,664,990 A) and Pierson (*Handbook of Chemical Vapor Deposition*).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach silica as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing (1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Adams teaches that silica is a hard, abrasive material, used in abrading processes (1:49-57).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, silica. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to adhere the abrasive particles to the backing.

Further, because Pierson teaches that silica may be deposited by vapor deposition (231-234), as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

With respect to claims 99 and 109, insofar as silica is a ceramic, this combination renders these claims obvious as well.

14. Claims 55, 69, 94, 98, 104, 108, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Julien (US 5,308,367 A) and Pierson (*Handbook of Chemical Vapor Deposition*).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach titanium nitride as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing (1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Julien teaches that titanium nitride is a hard, abrasive material, used in abrading processes (1:49-57).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, titanium nitride. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to adhere the abrasive particles to the backing.

Further, because Pierson teaches that titanium nitride may be deposited by vapor deposition (225-226), as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

15. Claims 55, 69, 95, 105, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Yu (US 5,314,843 A) and Pierson (*Handbook of Chemical Vapor Deposition*).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach titania as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing (1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Yu teaches that titania is a hard, abrasive material, used in abrading processes (5:50-68).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, titania. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to adhere the abrasive particles to the backing.

Further, because Pierson teaches that titania may be deposited by vapor deposition (236-237), as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

16. Claims 55, 69, 96, 106, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Kajiyama (US 4,547,998 A).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach silicon nitride as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing (1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Kajiyama teaches that titanium is a hard, abrasive material that may be vapor deposited onto the surface of a substrate (4:bottom).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, titanium. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to

adhere the abrasive particles to the backing. Further, because Kajiyama teaches that titanium may be deposited by vapor deposition, as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

17. Claims 55, 69, 97, 107, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontanella (US 3,508,890 A) in view of Martin et al. (US 5,085,671 A) and Pierson (*Handbook of Chemical Vapor Deposition*).

The teaching of Fontanella is detailed above. While this reference teaches a variety of cover layer materials, it does not explicitly teach zirconia as the cover layer material.

Fontanella teaches that the purpose of the cover layer is three-fold: (1) to increase cutting rate, (2) to increase abrading life, and (3) to adhere the abrasive more firmly to the backing (1:50-60). It is clear that such objectives can be achieved with films of hard, abrasive material other than those explicitly taught by Fontanella. Further, it is the examiner's position that one of ordinary skill in the art, cognizant of the materials he/she desires to polish, would select such a cover material as suited the particular application.

Martin teaches that zirconia is a hard, abrasive material, used in abrading processes (cols. 1-2).

It would have been obvious to one of ordinary skill in the art to modify the method of Fontanella so as to deposit, as the cover layer, zirconia. One of ordinary skill in the art would have been motivated to do so by the desire to deposit a hard, abrasive layer that also serves to adhere the abrasive particles to the backing.

Further, because Pierson teaches that zirconia may be deposited by vapor deposition (238-240), as in the method of Fontanella, one of ordinary skill in the art would have had a reasonable expectation of successfully making this combination.

Allowable Subject Matter

18. Claims 111-121 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. The following is a statement of reasons for the indication of allowable subject matter: While Fontanella suggests that the binder may be metallic (2:2-39), the prior art neither teaches nor suggests the intermediate layers recited in claims 111-121.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The definition of "resin" from *Merriam-Webster's Collegiate Dictionary*, 10th Edition, p. 996, is cited in support of the position that this term is inclusive of polymeric species.

The definition of "ceramic" from *Hawley's Condensed Chemical Dictionary*, 12th Edition, p. 240, is cited in support of the position that silica is a ceramic.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William P. Fletcher III whose telephone number is (571) 272-1419. The examiner can normally be reached on Monday through Friday, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WPF 7/26/2004

William P. Fletcher III
Examiner
Art Unit 1762



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